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Sociocultural—Geospatial Anthropological Portal (SC-GAP): Enhanced sociocultural understanding through crowdsourced service member narratives

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Abstract

Despite the Department of Defense's (DoD) many investments directed toward developing and fielding programs designed to advance sociocultural knowledge, the DoD nonetheless lacks a shared repository in which all entities can aggregate, visualize, and share sociocultural data across the enterprise. A gap analysis of DoD's desired and actual states of achieving and implementing a sociocultural understanding reveals three main shortcomings: a data gap, a repository gap, and a collaboration gap. As a consequence, we created a proof of concept, enterprise solution for DoD that bridges the overall sociocultural gap by harnessing the overlooked and untapped potential of today's deployed DoD service members, who over the course of their daily duties, are exposed to various populations' cultures. Service member observations and interpretations of service members' interactions form an untapped set of operationally relevant sociocultural data. The existing wellspring of sociocultural information needs only be collected and indexed using a framework derived from the *Five Operational Culture Dimensions* model. Residing on a geodatabase and interfaced via a custom multi-client supported web-based Geographic Information System (GIS), this framework integrates the collected data comprised of service member narratives with the greater Joint Force thereby creating a dynamic and collaborative sociocultural living repository. Combining an anthropologically sound framework that is operationally relevant with the capabilities of GIS results in a solution that will allow DoD personnel to uniformly populate, visualize, and share near real-time cultural data relevant to military operations across all services and agencies. This DoD enterprise solution has the potential to enhance the Nation's armed forces' strategic performance through the application of culturally adept military power

Keywords: Department of Defense; Military; Narratives; Culture; Sociocultural understanding

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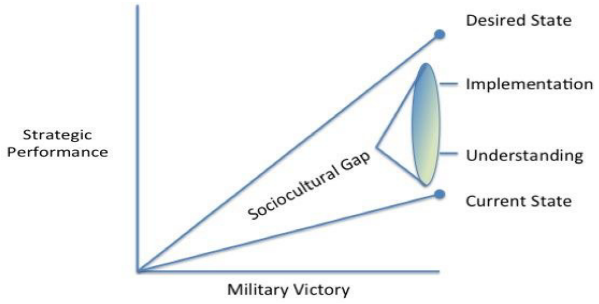

Fig. 1. Identified DoD sociocultural gap.

1. Introduction

The Department of Defense (DoD) continues to struggle with defining, collecting, understanding, and analyzing a population's sociocultural framework, as well as how to best incorporate it into military planning and operations [1]. This struggle is exemplified by the disconnect that currently exists between the desired and actual US strategic performance in recent population-centric conflicts. The disconnect is the direct result of a persistent sociocultural gap that remains between the sociocultural data—the human domain[1]—and its consumers—decision makers. Even with the DoD's recent acknowledgement and realignment of strategy towards population-centric warfare, the disconnect remains due to disjointed service and branch specific sociocultural initiatives, limited availability of relevant data, and the absence of an enterprise solution to collect, aggregate and share the data. A gap analysis of the DoD's desired and actual states of achieving and implementing a sociocultural understanding reveal three main shortcomings: a data gap, a repository gap, and a collaboration gap. These shortcomings and subsequently generated requirements shape our proposed framework and recommended solution.

The narrative-based solution harnesses the overlooked and untapped sociocultural, data producing potential of today's deployed DoD service members, who over the course of their daily duties are directly or indirectly exposed to a population's relevant sociocultural information. The existing wellspring of sociocultural information needs only be collected and indexed using a framework derived from Salmoni and Holmes-Eber's *Five Operational Culture Dimensions* model to begin to bridge the overall sociocultural gap [2]. Residing on a web-based Geographic Information System (GIS) interface, SC-GAP aggregates collected data, comprised of service member narratives, from the greater Joint Force thereby creating a dynamic and collaborative sociocultural living repository. By combining an anthropologically sound framework with operational relevance and the structure of a GIS, the SC-GAP proof of concept allows DoD personnel to uniformly populate, visualize, and share near real-time cultural data relevant to military operations across all services and agencies within the DoD. Ultimately, bridging the identified sociocultural gap within the DoD and providing an enterprise solution to "building a process from the sensor all the way to the political decision makers" enhances the Nation's strategic performance through the application of culturally adept military power [3].

2. Gap analysis

A disconnect currently exists between the desired and actual DoD strategic performance in recent population-centric conflicts, as illustrated in Fig. 1 above. Examining this disconnect through the lens of gap analysis serves as our departure point to identify and understand the genesis of the sociocultural gap. This gap analysis first observes the national policy driving the shift and the resulting DoD's desired state of increased overall strategic performance through an integrated sociocultural understanding of the human domain. It then contrasts the desired end state with

[1] The human domain is the totality of the physical, cultural, and social environments that influence human behavior to the extent that success of any military operations or campaign depends on the application of unique capabilities that are designed to fight and win population-centric conflicts. - Definition taken from ADM McRaven's USSOCOM Operating Concept [4]

the current DoD capabilities' *ways* and *means* to achieve that end state, resulting in the identification of ongoing shortcomings and subsequent recommendations. As recent conflict demonstrates, a sustainable global security environment hinges on the people; therefore, the human domain—people—is a strategic imperative to the performance of the U.S. national defense and military strategies [5]. The previous decades' "misunderstanding of cultures and [the U.S.] enemies' motivations" masked this underlying necessary objective, the human domain, ultimately leading to the disparity between military victory and desired strategic performance [6].

Through the analysis above, three main DoD deficiencies are inferred: a disjointed array of resources, limited availability of relevant sociocultural data, and the absence of an enterprise solution for data management. The first deficiency is a disjointed array of resources of military service, branch- and theater-specific initiatives and Tactics Techniques and Procedures intended to map the human domain. The second deficiency, limited availability of relevant sociocultural data, encompasses the current lack of access to or means to collect timely and relevant data to adequately develop a sociocultural understanding of the Operating Environment (OE). The final deficiency, absence of an enterprise solution to data management, speaks to the current lack of ability to collect, aggregate, and share sociocultural data across all services and agencies within the DoD. This lack of an enterprise solution exacerbates the previous two deficiencies by further isolating the limited data already collected by the disjointed and uncoordinated initiatives. Together, these three deficiencies within the current DoD enterprise comprise the aforementioned sociocultural gap.

From these deficiencies, three broad requirements shape the recommendations and subsequent development of the proof of concept solution to the identified sociocultural gap. First, the DoD needs to seek out additional means by which to gain access to and collect relevant sociocultural data. Having access to relevant sociocultural data is critical in building the necessary understanding of a population and the OE to achieve a "strategic win" [7]. Second, the DoD needs a singular repository for the collected sociocultural data. A review of current concepts and capabilities demonstrates that while the demand for a comprehensive understanding of the human domain is present, there are minimal *ways* or *means* by which insights gained within the DoD are collected, visualized, and shared between the individual command echelons. Lastly, the DoD needs a unified way by which to collectively synchronize the Joint Force's efforts in regards to achieving a sociocultural understanding and implementation of that understanding into military planning and operations. A common sociocultural framework accomplishes this, enabling the collection, indexing, storage, sharing, and implementation of the data across the DoD enterprise. Merely possessing a sociocultural understanding of the human domain does not assure a strategic win; only through its implementation by the Joint Force throughout all phases of the Joint Phasing Model will the DoD begin to advance towards an improved state.

3. Methodology (framework and narratives)

This proof of concept posits that the source of the sociocultural data is an existing yet untapped resource of the DoD: its personnel. DoD personnel have access, by nature of their profession, to a multitude of relevant sociocultural data spanning the global population. This operational cultural knowledge base remains untapped, yet is vital to decision makers due to its vast insightfulness into the aspects of culture that impact operations, as well as how military operations impact an existing culture [8]. Across the force, the DoD maintains either an episodic or persistent presence throughout a majority of the globe, "with every additional node in the human network… add[ing] an exponential understanding of the problem area" [9]. SC-GAP enables data to be collected, validated, and updated near real-time by a variety of sources allowing for a more comprehensive sociocultural understanding.

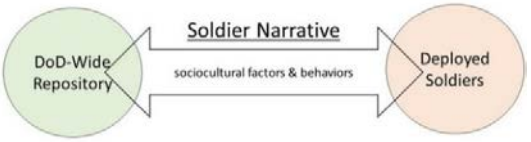

Fig. 2. Transmission of soldier narrative.

Narrative prevails as the best medium to transfer such critical sociocultural data; through its distinct features, narrative possesses the ability to "tell people what to expect in various situations so that the listener can benefit from the experience without having to go through it personally," as depicted in Fig. 2 [10]. As "Man is…essentially a story-telling animal," service members can effortlessly convey their sociocultural knowledge by developing, expressing, and sharing their own narratives, or stories [11]. Combining the source pool of service members with the capabilities of narrative, the SC-GAP proof of concept creates a unique data set—Soldier Narrative—built around the stories of soldiers' observations and experiences garnered through interaction with other cultures. To facilitate the data collection, the proof of concept incorporates sociocultural ontology, further enhancing the development, expression, and sharing of soldier narratives through a self-administered questionnaire approach.

Using the aforementioned cultural framework and service member narratives as a primary source of sociocultural data, we apply a web-based Geographic Information System (GIS) interface to collect, aggregate, display, and share the sociocultural data. The reasoning behind choosing a web-based GIS interface to display sociocultural data is threefold: 1) GIS interfaces are both familiar and ubiquitous in the military and across society in today's information age; 2) Web-based geodatabases are powerful and adaptable, capable of fusing narrative and non-narrative data into a single repository; and 3) Cloud computing and advances in information technology make web-based GIS readily accessible and facilitate populating and validating inputted data through crowdsourcing. The web-based GIS database is structured with three components: narrative and non-narrative data layers, a web map, and a user interface. Through this living sociocultural repository, the proof of concept allows for validation of geospatially tagged narratives through crowdsourcing the collective knowledge of entire DoD enterprise. Crowdsourcing, in this way, grants the sociocultural repository the ability to ingest previously unverified data to get the ground truth, either disputing the validity of the data or lending it more credibility.

This mechanism will assist in bridging the gap between academia and deployed service members as well, allowing for collaboration and exchange of real-time empirical data to aid in either developing or disproving sociological theories. The characteristics of crowdsourcing, joined with the capabilities of service member narratives and GIS, enable the collecting, visualizing, and sharing of sociocultural data through the DoD community.

4. Proof of concept

Sociocultural - Geospatial Anthropological Portal (SC-GAP) is the proof of concept solution to resolving the DoD's sociocultural gap by addressing its three shortcomings—the data gap, the repository gap, and the collaboration gap—which currently exist between the DoD's desired and actual states of strategic performance. SC-GAP bridges this sociocultural gap through the use of three mutually supportive methodologies—narratives, Geospatial Information Systems (GIS), and crowdsourcing—culminating in the generation of a web-based living repository comprised of a unique dataset of service members' cultural observations and experiences. The goal of SC-GAP is to leverage the previously detailed evidentiary base derived from the gap analysis, existing DoD client-server GIS capabilities, and a collaborative custom interface to best collect, visualize, and share sociocultural data between service members and decision makers in near-real-time. SC-GAP's objectives include:

- Demonstrate the means to elicit and collect the unique sociocultural dataset based on service member narratives
- Demonstrate a singular living repository structured around the proposed common and intuitive sociocultural framework
- Maximize accessibility, data volume, and utility while working within the existing DoD resources and infrastructure
- Increase the DoD's sociocultural understanding and its implementation into military planning and operations
- Enhance existing DoD processes, initiatives, and decision making

Within the GIS environment, SC-GAP maintains three core components—a geodatabase, published online services, and a custom developed user interface. Using the *Five Operational Culture Dimensions* model, SC-GAP's geodatabase structures the soldier-sensor narrative data by applying a hierarchal, anthropologically sound framework, resulting in the subsequent generation of 31 cultural variables comprised of 116 subordinate cultural

Fig. 3. SC-GAP geodatabase variables and sub-traits.

trait data layers within the SC-GAP geodatabase. These are shown in Fig. 3. Each of these variable and trait data layers contains associated attributes by which the data is indexed, stored, and queried. The associated attributes include the National Geospatial Agency's Human Geography Themes, Joint Phasing Model, level of data fidelity, cultural model, cultural dimension, multimedia files, observations, validation log, and administrative data.

5. SC-GAP process

SC-GAP bridges the sociocultural gap using the four-step process shown Fig. 4. Key nodes in the process include a local population, the service member, the SC-GAP repository, and the DOD-wide community. The SC-GAP process is a closed loop system comprised of inputs, outputs, and throughputs, with each iteration of the process

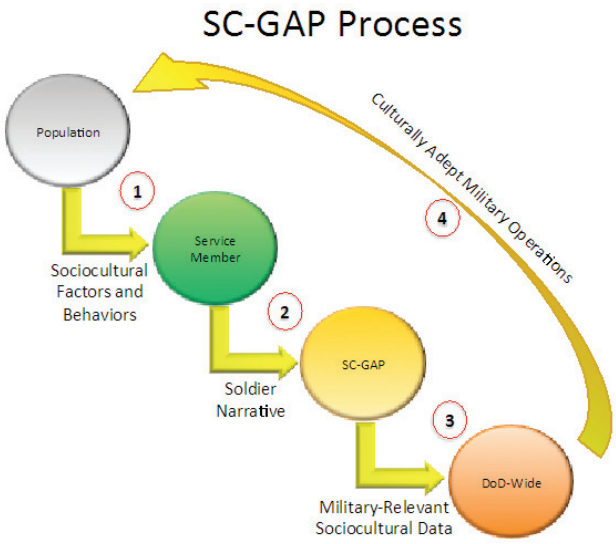

Fig. 4. SC-GAP process flow chart.

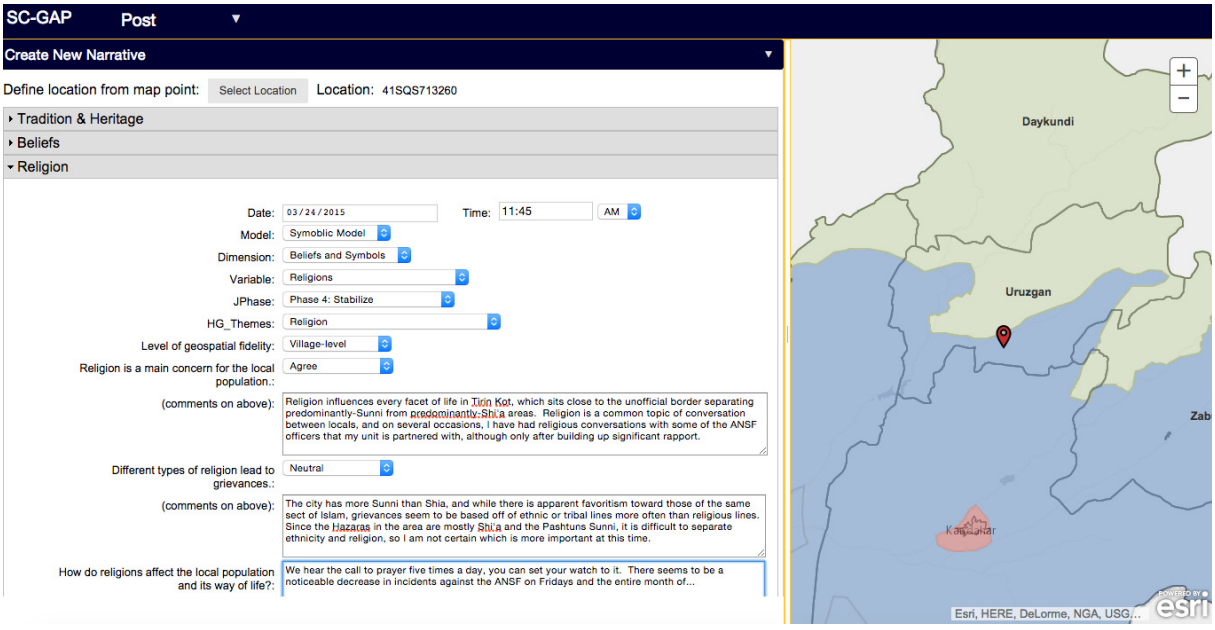

Fig. 5. SC-GAP narrative input interface.

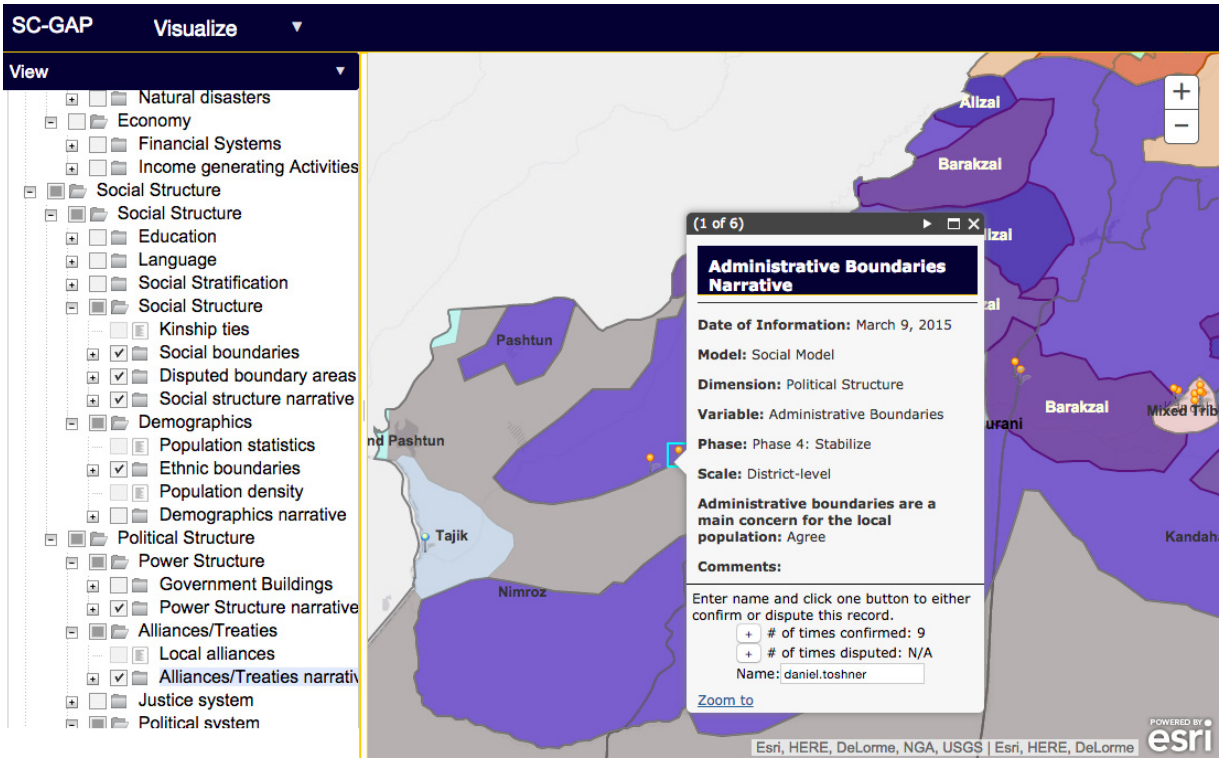

Fig. 6. SC-GAP data visualization.

Fig. 7. Applicability of SC-GAP to existing decision frameworks.

contributing to the collective sociocultural knowledge contained within the repository. The process proceeds through the steps as follows: 1) Data flows from a population via sociocultural factors and behaviors, which are observed and internalized by the service member; 2) The service member produces a narrative and articulates it into the SC-GAP repository, along with new or updated sociocultural factor data (an example of the interface is shown in Fig.5).

3) The SC-GAP repository aggregates captured narratives and sociocultural factor data from multiple users, yielding military-relevant sociocultural data that can be used by decision makers at all levels of the DoD. An example of aggregated data is shown in Fig. 6.

4) DoD-wide decision makers use the SC-GAP knowledge to plan and execute culturally adept military operations. SC-GAP's plays a central role in enabling DoD decision making processes by complimenting existing frameworks to include Joint Intelligence Preparation of the Operational Environment (JIPOE); Political, Military, Economic, Social, Infrastructure, Information, Physical Environment, and Time (PMESII-PT); Areas, Structures, Capabilities, Organizations, People, and Events (ASCOPE); Distributed Common Ground System – Army (DCGS-A); and Diplomacy, Information, Military, Economics (DIME) depicted in Fig. 7. These operations in turn impact the local population, shaping sociocultural factors and potentially the resulting behaviors, thereby continuing the SC-GAP cycle.

6. Conclusion

SC-GAP takes a critical step toward resolving DoD's sociocultural gap due to its web-based structure, the iterative SC-GAP process, and applicability to current decision making frameworks. Through SC-GAP's three core components—a geodatabase, published online services, and a custom user interface—the proof of concept solution provides a tool to unify the Joint Forces' efforts in understanding and implementing sociocultural data into military operations. The server-based multi-client nature of SC-GAP allows for a multitude of concurrent users to be in different steps of the SC-GAP process independent of each other, while each cycle contributes to the body of cultural knowledge contained within the repository. Furthermore, data from the repository can easily be exported to support existing DoD sociocultural frameworks such as PMESII-PT, ASCOPE, and DIME. Thus, SC-GAP provides an enterprise solution for bridging the sociocultural gap, providing the benefit of enhanced sociocultural understanding through crowdsourced service member narratives.

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